

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

:

Robert HAMMOND-SMITH, et al. : Examiner: James A. Dudek

Serial No.: 10/527,693 : Group Art Unit: 2871

Filed: March 11, 2005 :

Title: BIREFRINGENT MARKING

**BRIEF ON APPEAL UNDER 37 C.F.R. §41.37**

**MAIL STOP: APPEAL BRIEF - PATENTS**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Further to the Notice of Appeal filed October 15, attached herewith is Appellants' Brief on Appeal, pursuant to 37 CFR §41.20(b)(2). This is an appeal from the decision of the Examiner finally rejecting claims 1-21 and 24-36 in the Office Action issued June 15, 2007.

**(1) REAL PARTY IN INTEREST**

The application is assigned of record to Merck Patent GmbH, who is the real party in interest herein. The assignment is recorded in Reel 017075/Frame 0585.

## **(2) RELATED APPEALS AND INTERFERENCES**

Appellants, their legal representative and the assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

## **(3) STATUS OF THE CLAIMS**

Claims rejected: 1-21 and 24-36;

Claims allowed: None;

Claims canceled: 22-23;

Claims withdrawn: None;

Claims objected to: None;

Claims on Appeal: 1-21 and 24-36. A copy of the claims on appeal is provided in the attached Claim Appendix.

## **(4) STATUS OF AMENDMENTS AFTER FINAL**

Subsequent to the Final Office Action issued June 15, 2007, Appellants filed amendments to the claims in the Reply under 37 CFR 1.116 filed August 16, 2007. In the Advisory Action issued September 13, 2007, the Examiner indicated that the amendments would be entered for purposes of appeal.

## **(5) SUMMARY OF THE CLAIMED SUBJECT MATTER**

Appellants' claimed invention is described by two independent claims, i.e., claims 1 and 16. As recited in Appellants' independent claim 1, the invention relates to a method of preparing a birefringent marking comprising: printing a polymerisable liquid crystal material onto at least one surface of a reflective substrate; and polymerising the liquid crystal material, whereby a birefringent marking is formed on the reflective substrate. See, for example, page 3, line 34 - page 4, line 15.

As further recited in claim 1, the polymerizable liquid crystal material is printed onto

the reflective substrate by screen printing, offset printing, dry offset printing reel-to-reel printing, letter press printing, gravure printing, rotogravure printing, flexographic printing, intaglio printing, pad printing, heat-seal printing, ink-jet printing, thermal transfer printing or printing by means of a stamp or printing plate. See, e.g., page 11, lines 11-17.

Further, again as recited in claim 1, the printing of the polymerizable liquid crystal material onto the reflective substrate induces or enhances spontaneous alignment of the polymerizable liquid crystal material on the reflective substrate. See, e.g., page 11, lines 15-17.

Additionally, as recited in Appellants' other independent claim, claim 16, the invention also relates to a method of preparing a birefringent marking comprising: polymerizing a polymerizable liquid crystal material that has been printed onto at least one surface of a reflective substrate. See, for example, page 3, line 34 - page 4, line 15.

Aside from the above method embodiments, the invention further relates to materials obtainable by the claimed methods. These materials include: a birefringent marking (see claim 11; page 3, line 34 - page 4, line 15); a security authentication or identification marking, thread or device comprising at least one birefringent marking (see claims 13 and 18; page 4, lines 21-23); and a document of value, a hot stamping foil, a reflective foil, or an optical data storage device, having at least one birefringent marking (see claims 14 and 15; page 4, lines 25-29).

## **(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

The grounds of rejection on Appeal are:

- (1) whether claims 1-21 and 24-36 are unpatentable under 35 USC 102(b), on grounds of anticipation, in view of Coates et al. (GB 2357061).

## (7) APPELLANTS' ARGUMENTS

### **I. Rejection under 35 USC 102(b) in view of Coates et al. (GB 2357061)**

Claims 1-21 and 24-36 are rejected as allegedly being anticipated in view of Coates et al. (GB '061). This rejection is respectfully traversed.

The crux of the rejection is the term “printing” as recited in Appellants’ claims 1 and 16. The Examiner contends that GB '061 describes printing a polymerisable liquid crystal material onto at least one surface of a reflective substrate. Appellants disagree.

#### **Claims 1 and 16**

As can be seen from a comparison of the independent claims, the method of claim 16 is broader than that of claim 1. The following arguments relate to both claims. The additional features recited in claim 1 are discussed separately below.

To establish anticipation, the rejection must indicate where the asserted anticipatory reference discloses each feature of the rejected claim. See, e.g., *Ex parte Levy*, 17 USPQ2d 1461, 1462 (POBA 1990) [“Moreover, it is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference.”].

The rejection fails to indicate where GB '061 describes printing a polymerisable liquid crystal material onto at least one surface of a reflective substrate. Thus, the rejection should be reversed.

The disclosure of GB '061 relates to hot stamping foils. GB '061 discloses a hot stamping foil comprising a layer of liquid crystal material. See, e.g., Figure 2 which illustrates such a hot stamping foil. Layer 1 is a hot melt adhesive. Layer 2 is a reflective layer such as a metal layer. Layer 6 is the layer of liquid crystal material. Layer 3 is a clear or colored lacquer. Layer 4 is a wax release layer, and layer 5 is a support such as a PET film. See page 6, lines 1-6.

In use, the hot stamp foil is placed on a substrate whereby the hot melt adhesive layer 1 comes into contact with the substrate. A patterned hot metal stamp is placed against support layer 5 resulting in the melting of certain areas of the wax release layer 4 and certain areas of the hot melt adhesive 1. The melted areas of the adhesive then adhere to the substrate. The hot stamp and hot stamping foil can then be removed resulting in the hot

stamp foil being torn apart between the melted regions of wax release layer and the support whereas in the non-melted regions the hot stamping foil is completely removed from the substrate. These leaves behind an image formed from layers of adhesive 1, metal 2, liquid crystal material 6, and lacquer 3. See page 6, lines 8-25.

In the paragraph bridging pages 7-8, GB '061 describes a procedure for making the liquid crystal layer of the hot stamp foil. The procedure involves coating a layer of polymerizable liquid crystal material onto a plastic film and then polymerizing the liquid crystal material. The resultant polymerized liquid crystal film is then removed from the plastic film and laminated onto another plastic film and covered with a metal film or layer. Such a procedure clearly does not suggest printing a polymerizable liquid crystal material.

In Example 1 of GB '061, the liquid crystal material is applied to a PVA layer using a bar coating technique. The polymerizable liquid crystal material is then cured and covered with an aluminum layer. This technique also does not suggest applying a liquid crystal material to a substrate by printing.

In the rejection, reference is made to page 8, lines 10-12 of GB '061. This portion of the disclosure refers to a procedure of making the liquid crystal layer 6, wherein the layer of polymerizable liquid crystal material is coated or laminated directly onto a reflective layer. This disclosure also does not mention or suggest printing. Further, this disclosure refers to the formation of a layer, not print or an image. Nothing within the rejection suggests that one of ordinary skill in the art would consider forming a layer by coating or laminating to constitute printing.

In the rejection, it is asserted that "printing is broad." This is a merely a conclusion. The rejection offers no rationale as to why "printing" is said to be broad.

The rejection also asserts that "the fact that 061 is for identification the end result is a print, and thus, printing take place in the form of coating and patterning." The rejection does not explain why any process which results in formation of a means of identification constitutes "printing."

It is correct that the use of the hot stamping foil of GB '061 results in the formation of an image, as described above. However, the process used by GB '061 to form the image does not suggest Appellants' claimed process of preparing a birefringent marking.

Referring to the procedure described at pages 6 and 8 of GB '061, the polymerizable

liquid crystal material layer 6 is coated or laminated onto the reflective layer and polymerized. The hot stamping foil is then assembled. Thereafter, the hot stamping foil is applied to a substrate, and a hot stamp is applied to support layer 5. It is not until after the hot stamp is applied to support layer 5 that an image is formed on the substrate.

Application of the hot stamp occurs well after the liquid crystal material layer 6 is coated or laminated onto the reflective layer and polymerized. Thus, it is evident that the procedure described at pages 6 and 8 of GB '061 **does not describe or suggest printing** a polymerizable liquid crystal material onto a reflective substrate, and then polymerising the liquid crystal material.

In the rejection, the Examiner takes a broad interpretation of printing asserting that “the term printing is broad and the fact that 061 is for identification the end result is a print, and thus, printing takes place in the form of coating and patterning.” See page 2 of the Final Office Action issued June 15, 2007. Further, at page 3 of the June 15, 2007 Office Action, the Examiner argues that while Appellants argue a narrow definition of printing the Examiner “contends that when the liquid crystal is patterned a printing process takes place.”

Appellants respectfully disagree with the Examiner’s assertions. Firstly, no support is given for the assertion that identification necessarily means that a printing process occurs. Furthermore, the Examiner does not indicate why GB '061 is interpreted as describing applying a liquid crystal in the form of a pattern. As discussed above, it is true that a hot stamping foil can be **used** to form an image. But, the rejection blurs the concepts of **producing** a hot stamping foil and **using** a hot stamping foil.

The Examiner asserts that “coating and patterning”, as described by GB '061, constitutes printing. But, the rejection fails to recognize that this “printing” procedure involves an intervening step, namely polymerization. Thus, the “printing” asserted in the rejection involves coating polymerizing, and the patterning. Hence, GB'061 does not describe printing and then polymerizing, even under the Examiner’s definition of “printing.”

Beginning at page 7, line 33, GB '061 describes the production of the hot stamping, particularly as to the application of the liquid crystal material. The layer of liquid crystal material is “prepared by coating a layer of liquid crystal material onto a substrate,” and then polymerized. The resultant film can be transferred to a plastic film and covered with a metal layer. Alternatively, the layer of polymerizable liquid crystal material can be coated or

laminated directly onto the reflective layer. See page 8, lines 10-16. Such a coating or laminating procedure clearly does not suggest a printing procedure, even under the Examiner's interpretation of printing. There is no description in this portion of the disclosure of any patterning. The patterning occurs after polymerization, and after formation of the hot stamping foil. Patterning doesn't occur until after the hot stamping foil is used.

When using a hot stamping foil, the foil is applied to a substrate and a stamping die is used to form an image or pattern. As discussed previously, in use, the hot stamp foil is placed on a substrate and then a patterned hot metal stamp is placed against the support layer of the foil resulting in the melting of certain areas of the wax release layer and certain areas of the hot melt adhesive. The hot stamp and hot stamping foil can be removed. These leave behind an image formed from layers of adhesive 1, metal 2, liquid crystal material 6, and lacquer 3. See page 6, lines 8-25.

At page 10, beginning at line 30, GB '061 describes an "image." It is evident from this disclosure that this is an image formed by the use of the hot stamping foil, not a pattern used in the formation of the hot stamping foil.

Nothing within the rejection suggests that one of ordinary skill in the art would consider forming a layer by coating or laminating to constitute printing. GB '061 provides no suggestion and in fact is silent with respect to printing a polymerisable liquid crystal material onto at least one surface of a reflective substrate, and then polymerising the liquid crystal material.

In view of the above remarks, it is respectfully submitted that GB '061 **does not describe or suggest printing** a polymerizable liquid crystal material onto a reflective substrate, and then polymerising the liquid crystal material, as recited in Appellants' claims 1 and 16. Reversal of the anticipation rejection is respectfully requested.

### **Claim 1**

In the Rule 116 Amendment filed August 16, 2007, claim 1 was amended to incorporate the recitation of claims 22-23 (now cancelled). This amendment has been entered (Advisory Action issued September 13, 2007).

In the rejection, the sole comment regarding Appellants' claims 22 and 23 is, "Per claim 19-36, see page 8-13." See page 3 of the Final Office Action issued June 15, 2007. As

noted above, to establish anticipation, the rejection must indicate where the asserted anticipatory reference discloses each feature of the rejected claim. *Ex parte Levy*. Mere reference to six pages of text does not identify wherein each and every facet of the claimed invention is disclosed in GB '061.

By the incorporation of claim 22, claim 1 now recites the use of particular printing processes. GB '061 provides no disclosure or suggestion of these printing processes. As noted above, the rejection fails to indicate where GB '061 discloses these printing processes.

In addition, by the incorporation of claim 23, claim 1 now recites that printing of the polymerizable liquid crystal material onto the reflective substrate induces or enhances spontaneous alignment of the polymerizable liquid crystal material on the reflective substrate.

GB '061 is completely silent with respect to inducing or enhancing spontaneous alignment of a polymerizable liquid crystal material on a reflective substrate by printing the polymerizable liquid crystal material onto the reflective substrate.

At page 18, lines 9-32, GB '061 describes how to achieve planar alignment of the polymerizable liquid crystal material, such as by the use of an alignment layer, by rubbing or by adding surfactants. However, GB '061 does not disclose inducing or enhancing spontaneous alignment of the polymerizable liquid crystal material via a printing process.

In view of the above remarks, it is respectfully submitted that GB '061 **does not describe or suggest printing** a polymerizable liquid crystal material onto a reflective substrate, and then polymerising the liquid crystal material, as recited in Appellants' claim 1. Nor does GB '061 describe the printing processes recited in claim 1, or inducing or enhancing spontaneous alignment of a polymerizable liquid crystal material via a printing process, as recited in claim 1. Reversal of the anticipation rejection is respectfully requested.

### **Claims 19-21 and 24-36**

As noted above, with respect to claims 19-36, the Examiner merely cited six pages of the disclosure of GB '061, i.e., "Per claim 19-36, see page 8-13." In the Rule 116 Amendment filed August 16, 2007, Appellants expressly requested, if the Examiner maintained the rejection of these claims, that, for purposes of furthering prosecution, the Examiner specifically indicate where in the disclosure of pages 8-13 of GB '061 each of the features recited in claims 19-36 was disclosed. The subsequent Advisory Action issued

September 13, 2007, merely stated that “the arguments are not persuasive.”

As stated by the Board in *Levy*, it is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference. Merely citing six pages of disclosure does not identify where GB'061 discloses each and every feature recited in claims 19-21 and 24-36. Thus, the rejection of claims 19-21 and 24-36 should be reversed on this basis alone.

**(8) CONCLUSION**

For all of the above reasons, it is urged that the decision of the Examiner finally rejecting claims 1-21 and 24-36, on appeal, is in error and should be reversed.

Respectfully submitted,

/Brion P. Heaney/

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Brion P. Heaney  
Registration No. 32,542

**Filed: December 7, 2007**

## **CLAIMS APPENDIX**

1. (Previously Presented): A method of preparing a birefringent marking comprising:

printing a polymerisable liquid crystal material onto at least one surface of a reflective substrate; and

polymerising the liquid crystal material,

whereby a birefringent marking is formed on said reflective substrate,

wherein said polymerizable liquid crystal material is printed onto the reflective substrate by screen printing, offset printing, dry offset printing reel-to-reel printing, letter press printing, gravure printing, rotogravure printing, flexographic printing, intaglio printing, pad printing, heat-seal printing, ink-jet printing, thermal transfer printing or printing by means of a stamp or printing plate, and

printing of said polymerizable liquid crystal material onto the reflective substrate induces or enhances spontaneous alignment of the polymerizable liquid crystal material on said reflective substrate.

2. (Previously Presented): A method according to claim 1, wherein the liquid crystal material is a nematic or smectic liquid crystal material.

3. (Previously Presented): A method according to claim 1, wherein the substrate comprises at least one metallic or metallised layer.

4. (Previously Presented): A method according to claim 3, wherein the metal is selected from aluminium, gold and copper.

5. (Previously Presented): A method according to claim 1, wherein the substrate comprises at least one layer of reflective pigments.

6. (Previously Presented): A method according to claim 5, wherein the reflective pigments are selected from interference or pearlescent pigments and liquid crystal pigments.

7. (Previously Presented): A method according to claim 1, wherein the liquid crystal material comprises at least one compound which induces and/or enhances planar alignment.

8. (Previously Presented): A method according to claim 7, wherein the compound inducing and/or enhancing a planar alignment is a surfactant.

9. (Previously Presented): A method according to Claim 1, wherein the polymerised liquid crystal material has a splayed structure.

10. (Previously Presented): A method according to claim 1, wherein the polymerised liquid crystal material has a planar structure.

11. (Previously Presented): A birefringent marking obtainable by a method according to Claim 1.

12. (Previously Presented): In a method of applying a decorative, security, authentication or identification marking to an item, the improvement wherein said marking is a birefringent marking prepared according to claim 1.

13. (Previously Presented): A security authentication or identification marking, thread or device comprising at least one birefringent marking prepared according to claim 10.

14. (Previously Presented): In a document of value, a hot stamping foil, a reflective foil, or an optical data storage device, the improvement wherein said document of value, hot stamping foil, reflective foil, or optical data storage device has at least one

birefringent marking according to claim 11.

15. (Previously Presented): A document of value, a hot stamping foil, a reflective foil, or an optical data storage device comprising at least one security, authentication or identification marking, thread or device according to claim 13.

16. (Previously Presented): A method of preparing a birefringent marking comprising: polymerizing a polymerizable liquid crystal material that has been printed onto at least one surface of a reflective substrate.

17. (Previously Presented): A method according to claim 2, wherein the polymerised liquid crystal material has a planar structure.

18. (Previously Presented): A security, authentication, or identification marking, thread or device comprising at least one birefringent marking prepared according to claim 17.

19. (Previously Presented): A method according to claim 1, wherein said birefringent marking is prepared separately on said at least one surface of said reflective substrate; and then said marking and reflective substrate are applied to a document of value.

20. (Previously Presented): A method according to claim 2, wherein said birefringent marking is prepared separately on said at least one surface of said reflective substrate; and then said marking and reflective substrate are applied to a document of value.

21. (Previously Presented): A method according to claim 1, wherein said polymerizable liquid crystal material comprises a liquid crystal material and a solvent.

22. (Cancelled):

23. (Cancelled):

24. (Previously Presented): A method according to claim 1, wherein said polymerizable liquid crystal material further comprises a polymeric binder or one or more monomers capable of forming a polymeric binder.

25. (Previously Presented): A method according to claim 1, wherein said polymerizable liquid crystal material does not contain a binder.

26. (Previously Presented): A method according to claim 8, wherein said surfactant is a fluorocarbon surfactant.

27. (Previously Presented): A method according to claim 28, wherein said fluorocarbons surfactant is of formula I:



wherein

n is an integer from 4 to 12, and

x is an integer from 5 to 15.

28. (Previously Presented): A method according to claim 7, wherein the amount of said compound in said polymerizable liquid crystal material 0.01 -5 weight %.

29. (Previously Presented): A method according to claim 1, wherein said birefringent marking has a birefringence in the range from 0.1 to 0.3 and a thickness from 0.5 to 20  $\mu$ m.

30. (Previously Presented): A method according to claim 1, wherein said birefringent marking further comprises one or more further layers applied onto said birefringent marking.

31. (Previously Presented): A method according to claim 30, wherein said one or more further layers are selected from a protecting layer, a support layer, an adhesive layer, a reflecting layer, an optical retardation layer, a color filter, a polarizer, or combinations thereof.

32. (Previously Presented): A method according to claim 2, wherein said polymerizable liquid crystal material further comprises a surfactant, said polymerizable liquid crystal material is printed onto discrete regions of said reflective substrate, and said reflective substrate is a metallized or metal substrate.

33. (Previously Presented): A method according to claim 32, wherein said liquid crystal material is a nematic liquid crystal material.

34. (Previously Presented): A method according to claim 2, wherein said polymerizable liquid crystal material further comprises a surfactant, said polymerizable liquid crystal material is printed onto discrete regions of a paper substrate that is covered by a layer of interference pigments dispersed in a transparent binder.

35. (Previously Presented): A method according to claim 34, wherein said liquid crystal material is a nematic liquid crystal material.

36. (Previously Presented): A method according to claim 1, wherein said birefringent marking is invisible under unpolarized light and is visible when viewed through a polariser.

**EVIDENCE APPENDIX**

Not Applicable.

**RELATED PROCEEDINGS APPENDIX**

Not Applicable.